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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/787,337	02/26/2004	Stephen Todd	E0295.70199US00	3987
46630 7590 09/01/2009 EMC Corporation c/o WOLF, GREENFIELD & SACKS, P.C. 600 ATLANTIC AVENUE BOSTON, MA 02210-2206				
EXAMINER NAJEE-ULLAH, TARIQ S				
ART UNIT 2453		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/787,337

Applicant(s)

TODD ET AL.

Examiner

TARIQ S. NAJEE-ULLAH

Art Unit

2453

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 August 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12, 14-32, 34-54, 56-71, 73-88, 90-108 and 110-116 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 14-32, 34-54, 56-71, 73-88, 90-108 and 110-116 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 September 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This is the Office action in response to the after final amendment filed August 11, 2009. Claims 1-12, 14-32, 34-54, 56-71, 73-88, 90-109 and 110-116 are pending.
2. Applicant's request Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Response to Arguments

3. Applicant's arguments filed August 11, 2009 with respect to prior art rejections of the claims rejected under 35 U.S.C. 103(a) have been fully considered but they are not persuasive. Applicant argues that Nakayama "fails to disclose or suggest the use of a content address to identify units of data" (Amendment filed August 11, 2009; pg. 23, ¶1). Examiner respectfully disagrees. Applicant's own specification defines content addressable storage as "...data is stored using a content address generated based upon the content of the data itself. The content address may be generated by applying a hash function to the data to be stored" (Specification as published, pg. 6, ¶54). Nakayama clearly teaches "After an address of the data written in the cache memory 26 is converted by the disk control unit 24, the address-converted data is stored in a predetermined area of the disk device group 30. When the data writing operation to the local disk is completed, the remote disk writing unit 102 transmits data received from the host computer 1 via the SAN 3 to the remote disk system 40 so as to store this transmitted data into the cache memory 56. After the address of the stored data in the

cache memory 56 of the remote disk system 40 is converted by the disk control unit 54, the address-converted data is stored in the remote disk", i.e. a content address generated based upon the content of the data itself. Nakayama further teaches "As a result, the write judging unit 104 compares the data written into the local disk with the data read from the remote disk just after the data has been transferred to the remote disk, and it judges whether or not both data are identical to each other", Examiner equates this aspect of Nakayama to the content addressable hash function mentioned in the Applicant's specification and definition of content addressable storage (Nakayama ¶85). Arguments are not clearly persuasive and previous rejection is maintained.

4. In conclusion, in an effort to better place the claims in condition for allowance, Examiner encourages further modification of claim language to include language that is more precisely descriptive and provides a more clear representation of what the Applicant presents as the invention in the specification in a manner which overcomes the prior art as presented. Examiner also reminds Applicant that although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-67, 69-84, 86-104, and 106-116 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Number 6,173,374 to Heil et al (Heil hereinafter) in view of US 2005/0005066 to Nakayama et al (Nakayama hereinafter).

Regarding claims 1, 21, 63, and 80, Heil discloses **receiving a request from a host computer to locate the unit of data previously stored in the storage environment** (Heil, fig. 3, step 400 shows an incoming request); **and in response to receipt of the request, determining on which one of the plurality of storage clusters the unit of data is stored** (Heil, fig. 3 shows a flowchart of how incoming requests are processed. In step 410, it is determined whether the unit of data requested is available on the local data disks or not. If the data requested is not on the local drives, the request is shipped to remote disks in the storage cluster) **based on the content address of the unit of data.**

Heil does not explicitly teach storing **based on the content address of the unit of data.** Nakayama teaches storing **based on the content address of the unit of data** (Nakayama ¶185; the storage environment is a content addressable storage environment storing data units in a content addressable manner). To provide the system and method of Heil with the added functionality of storing data in a content addressable manner would have been obvious to one of ordinary skill in the art, in view of the teachings of Nakayama, since all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have

yielded nothing more than predictable results to one of ordinary skill in the art at the time of the invention.

Regarding claims 41 and 97, Heil discloses **an input that receives a request from a host computer to locate a unit of data on at least one of a plurality of storage clusters in a storage environment** (Heil, fig. 3, step 400 shows an incoming request), **and at least one controller, coupled to the input, that: receives the request from the input** (Heil, fig. 2 shows the node, i.e. controller that is coupled to the network fibre channel backbone. Fig. 3, step 400 shows an incoming request to the node.); **and in response to receipt of the request, determines on which of the plurality of storage clusters the unit of data is stored** (Heil, fig. 3 shows a flowchart of how incoming requests are processed. In step 410, it is determined whether the unit of data requested is available on the local data disks or not. If the data requested is not on the local drives, the request is shipped to remote disks in the storage cluster).

Heil does not explicitly teach storing based on the content address of the unit of data. Nakayama teaches storing based on the content address of the unit of data (Nakayama ¶185; the storage environment is a content addressable storage environment storing data units in a content addressable manner). To provide the system and method of Heil with the added functionality of storing data in a content addressable manner would have been obvious to one of ordinary skill in the art, in view of the teachings of Nakayama, since all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have

yielded nothing more than predictable results to one of ordinary skill in the art at the time of the invention.

Regarding claims 2, 22, 64, and 81, Heil-Nakayama discloses the invention substantially as described in claims 1, 21, 63, and 80 above including, **wherein the host computer executes an application program that stores data to and retrieves data from the storage environment (Heil, col. 3, lines 30-48), wherein the host further executes an application programming interface that interfaces the application program to the storage environment, and wherein the act of receiving is performed by the application programming interface (Heil, col. 3, lines 30-48).**

Regarding claims 3, 23, 65, and 82, Heil-Nakayama discloses the invention substantially as described in claims 1, 21, 63, and 80 above including, **wherein the storage environment is coupled to the host computer by at least one communication link (Heil, figs. 1-2), wherein the host computer, the storage environment, and the at least one communication link form a computer system (Heil, figs. 1-2), wherein the computer system includes an appliance that monitors access requests from the host computer (Heil, fig. 3), and wherein the act of receiving the request further comprises an act of receiving, at the appliance, the request from the application (Heil, fig. 3; col. 3, lines 30-48).**

Regarding claims 4 and 24, Heil-Nakayama discloses the invention substantially as described in claims 3 and 23 above including, **wherein the act of determining is performed by the appliance (Heil, fig. 4A, step 502).**

Regarding claims 5, 25, 66, and 83, Heil-Nakayama discloses the invention substantially as described in claims 1, 21, 63, and 80 above including, **wherein the host computer executes an application program that stores data on the storage environment** (Heil, fig. 3; col. 3, lines 30-48), and **wherein the act of receiving the request further comprises an act of receiving the request directly from the application program** (Heil, fig. 3; col. 3, lines 30-48).

Regarding claims 6, 26, 67, and 84, Heil-Nakayama discloses the invention substantially as described in claims 4, 23, 66, and 83 above including, **wherein the act of receiving the request further comprises an act of receiving the request at least one of the plurality of storage clusters** (Heil, figs. 2-3).

Regarding claims 7, 27, and 49, Heil-Nakayama discloses the invention substantially as described in claims 6, 26, and 48 above including, **wherein the at least one of the plurality of storage clusters includes at least one access node that receives and processes access requests** (Heil, figs. 1-2), and **wherein the act of receiving the request from the application program at the at least one of the plurality of storage clusters further comprises an act of receiving the request at the at least one access node** (Heil, fig. 2 shows where the requests are received at the node, figs. 3-4C describe the steps of receiving a request.).

Regarding claims 8, 28, and 50, Heil-Nakayama discloses the invention substantially as described in claims 1, 21, and 41 above including, **wherein the act of determining comprises an act of performing a search for the unit of data on the plurality of storage clusters** (Heil; figs. 4A-4D; col. 4, lines 7-20).

Regarding claims 9, 29, and 51, Heil-Nakayama discloses the invention substantially as described in claims 8, 28, and 50 above including, **wherein the act of performing a search for the unit of data further comprises an act of performing the search serially through the plurality of storage clusters until the unit of data is found** (Heil; figs. 4A-4D; col. 4, lines 7-20).

Regarding claims 10, 30, and 52, Heil-Nakayama discloses the invention substantially as described in claims 8, 28, and 50 above including, **wherein the act of performing a search for the unit of data further comprises an act of performing the search** (Heil; figs. 4A-4D; col. 4, lines 7-20) **on each of the plurality of storage clusters in parallel** (Heil; col. 1, lines 44-45; col. 2, lines 16-22).

Regarding claims 11, 31, and 53, Heil-Nakayama discloses the invention substantially as described in claims 1, 21, and 41 above including, **wherein the act of determining is performed by at least one of the plurality of storage clusters** (Heil, fig. 3, fig. 4A, step 502).

Regarding claims 12, 32, and 54, Heil-Nakayama discloses the invention substantially as described in claims 1, 21, and 41 above including, **wherein the act of determining comprises locating the unit of data on at least one of the plurality of storage clusters without performing a search** (Heil; col. 4, lines 54-57, polls may be conducted instead of searches.).

Regarding claims 14, 34, and 56, Heil-Nakayama discloses the invention substantially as described in claims 1, 33, and 55 above including, **wherein the content address includes time information, based on when the unit of data was stored in**

the storage environment (Heil, col. 12, lines 19-59), **and the act of determining** (Heil, fig. 3, figs. 4A-4C) **comprises an act of determining on which of the plurality of storage clusters the unit of data is stored based, at least in part, on the time information of the content address of the unit of data** (Heil, col. 12, lines 19-59).

Regarding claims 15, 35, and 57, Heil-Nakayama discloses the invention substantially as described in claims 14, 34, and 56 above including, **wherein the act of determining further comprises an act of determining on which of the plurality of storage clusters the unit of data is stored based** (Heil, fig. 3, figs. 4A-4C), **at least in part, on a hash value of the time information of the content address of the unit of data** (Heil, col.13, lines 11-13).

Regarding claims 16, 36, 58, 75, 91 and 112, Heil-Nakayama discloses the invention substantially as described in claims 13, 33, 57, 72, 90 and 109 above including, **wherein the content address** (Heil, col. 8, lines 29-31) **includes a guaranteed unique identifier (GUID)** (Heil, col. 8, lines 29-30, unique addresses, i.e. guaranteed unique identifier), **and wherein the act of determining further comprises an act of determining** (Heil, fig. 3, figs. 4A-4C) **on which of the plurality of storage clusters the unit of data is stored based, at least in part, on the GUID** (Heil, col. 8, lines 29-30, unique addresses, i.e. guaranteed unique identifier).

Regarding claims 17, 37, 59, 76, 93 and 113, Heil-Nakayama discloses the invention substantially as described in claims 16, 36, 58, 75, 91 and 112 above including, **wherein the act of determining** (Heil, fig. 3, figs. 4A-4C) **further comprises an act of determining on which of the plurality of storage clusters the unit of data**

is stored based, at least in part, on a hash (Heil, col.13, lines 11-13) **of the GUID** (Heil, col. 8, lines 29-30, unique addresses, i.e. guaranteed unique identifier).

Regarding claims 18, 38, 60, 77, and 94, Heil-Nakayama discloses the invention substantially as described in claims 13, 33, 55, 72, and 89 above including, **wherein the act of determining** (Heil, fig. 3, figs. 4A-4C) **further comprises acts of: accessing information that specifies an algorithm that was used to select on which of the plurality of storage clusters the unit of data was stored, based on the content address of the unit of data** (Heil, col.13, lines 4-14); **and applying the algorithm to the content address of the unit of data to determine on which of the plurality of storage clusters the unit of data is stored** (Heil, col.13, lines 4-14).

Regarding claims 19, 39, 61, 78, 95 and 115, Heil-Nakayama discloses the invention substantially as described in claims 18, 38, 60, 77, 94 and 114 above including, **wherein the information specifies a plurality of algorithms used by the storage environment and during which period of time each of the plurality of algorithms was used to store units of data** (Heil, col.13, lines 4-14).

Regarding claims 20, 40, and 62, Heil-Nakayama discloses the invention substantially as described in claims 19, 39, and 61 above including, **wherein the information further specifies, for each one of the plurality of algorithms, at least one storage cluster that was in the storage environment during the period of time when the one of the plurality of algorithms was in effect** (Heil, col.13, lines 4-14).

Regarding claims 42 and 98, Heil-Nakayama discloses the invention substantially as described in claims 41 and 97 above including, **the host computer that accesses**

data stored in the storage environment (Heil, figs. 1-2; col. 1, lines 9-14); **and a communication link that couples the host computer to the storage environment to form a computer system** (Heil, figs. 1-2; col. 1, lines 9-14).

Regarding claims 43 and 99, Heil-Nakayama discloses the invention substantially as described in claims 42 and 98 above including, **wherein the at least one controller is disposed in the host computer** (Heil, figs. 1-2).

Regarding claims 44 and 100, Heil-Nakayama discloses the invention substantially as described in claims 42 and 98 above including, **wherein the at least one controller is disposed in the storage environment** (Heil, figs. 1-2).

Regarding claims 45 and 101, Heil-Nakayama discloses the invention substantially as described in claims 42 and 98 above including, **wherein the at least one controller is disposed in between the storage environment and the host computer in an appliance that monitors access requests from the host computer to the storage environment** (Heil, figs. 1-2).

Regarding claims 46 and 102, Heil-Nakayama discloses the invention substantially as described in claims 41 and 99 above including, **wherein the host computer executes an application program that stores data to and retrieves data from the storage environment** (Heil, figs. 1-3; col. 1, lines 9-14), **wherein the host further executes an application programming interface that interfaces the application program to the storage environment** (Heil, figs. 1-3; col. 1, lines 9-14), **and wherein the at least one controller receives the request at the application programming interface** (Heil, figs. 1-3; col. 1, lines 9-14).

Regarding claims 47 and 103, Heil-Nakayama discloses the invention substantially as described in claims 41 and 97 above including, **wherein the host computer executes an application program that stores data in the storage environment** (Heil, figs. 1-3; col. 1, lines 9-14; col. 3, lines 30-48), **and wherein the at least one controller receives the request directly from the application program** (Heil, figs. 1-3; col. 1, lines 9-14; col. 3, lines 30-48).

Regarding claims 48 and 104, Heil-Nakayama discloses the invention substantially as described in claims 44 and 100 above including, **wherein the apparatus is disposed in at least one of the plurality of storage clusters** (Heil, figs. 1-2).

Regarding claims 69, 87, and 107, Heil-Nakayama discloses the invention substantially as described in claims 63, 80, and 97 above including, **wherein the act of selecting further comprises an act of selecting one of the plurality of storage clusters to store the unit of data based on a load of at least one of the plurality of storage clusters** (Heil, col. 1, lines 24-36).

Regarding claims 70, 86, and 106, Heil-Nakayama discloses the invention substantially as described in claims 63, 80, and 97 above including, **wherein the act of selecting further comprises an act of selecting one of the plurality of storage clusters to store the unit of data based, at least in part, on an available storage capacity of each of the plurality of storage clusters** (Heil, col. 1, lines 24-36).

Regarding claims 71, 88, and 108, Heil-Nakayama discloses the invention substantially as described in claims 63, 80, and 97 above including, **wherein the act of**

selecting further comprises an act of selecting one of the plurality of storage clusters to store the unit of data based on a size of the unit of data (Heil, col. 1, lines 24-36).

Regarding claims 73, 90, and 110, Heil-Nakayama discloses the invention substantially as described in claims 63, 80, and 97 above including, **wherein the content address includes time information, based on when the unit of data was stored in the storage environment** (Heil, col. 12, lines 19-59), **and the act of selecting comprises an act of selecting one of the plurality of storage clusters to store the unit of data based, at least in part, on the time information of the content address of the unit of data** (Heil, col.13, lines 11-13).

Regarding claims 74, 91, and 111, Heil-Nakayama discloses the invention substantially as described in claims 73, 90, and 110 above including, **wherein the act of selecting further comprises an act of selecting one of the plurality of storage clusters to store the unit of data based, at least in part** (Heil, col. 12, lines 19-59), **on a hash value of the time information of the content address of the unit of data** (Heil, col.13, lines 11-13).

Regarding claims 79, 96, and 116, Heil-Nakayama discloses the invention substantially as described in claims 63, 80, and 97 above including, **storing the unit of data on the selected one of the plurality of clusters** (Heil, fig. 3, col. 3, lines 30-48).

Regarding claim 114, Heil-Nakayama discloses the invention substantially as described in claims 109 above including, **wherein the at least one controller: applies an algorithm to the content address of the unit of data to determine on which of**

the plurality of storage clusters to store the unit of data (Heil, col.13, lines 4-14);
and stores the algorithm in a record that indicates a time frame in which the
algorithm was in use (Heil, col.13, lines 4-14).

6. Claims 68, 85, and 105 rejected under 35 U.S.C. 103(a) as being unpatentable over Heil-Nakayama as applied to claims 63, 80, and 97 above, and further in view of US Patent Number 5,428,796 to Iskiyan et al (Iskiyan hereinafter).

Regarding claims 68, 85, and 105, Heil-Nakayama discloses the invention substantially as described in claims 63, 80, and 97 above including **wherein the act of selecting further comprises an act of selecting one of the plurality of storage clusters to store the unit of data** (Heil, fig. 3, col. 3, lines 30-48). Iskiyan teaches **using a round-robin technique** (Iskiyan, col. 8, lines 44-47). Heil-Nakayama does not explicitly teach storing **using a round-robin technique**. Iskiyan teaches **using a round-robin technique**. To provide the combination of Heil-Nakayama with added functionality of using a round-robin technique would have been obvious to one of ordinary skill in the art, in view of the teachings of Iskiyan, since all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded nothing more than predictable results to one of ordinary skill in the art at the time of the invention.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: US 2005/0080761 to Sundararajan et al ¶7; US 2002/0174305 to Vartti ¶7; US 2004/0010612 to Panya ¶118; US 6,065,108 to Tremblay et al (col. 25, lines 45-65); US 2005/0125411 to Kilian et al ¶s11-12, 32, 48.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TARIQ S. NAJEE-ULLAH whose telephone number is (571)270-5013. The examiner can normally be reached on Monday through Friday 8:30 - 6:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ario Etienne can be reached on (571) 272-4001. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tariq S Najee-ullah/

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Acting Examiner of Art Unit 2453

August 19, 2009

/ARIO ETIENNE/

Supervisory Patent Examiner, Art Unit 2457